

**MCGILL UNIVERSITY
FACULTY OF SCIENCE**

QUIZ 4

MATH 150, Section 6

Examiner: Professor V. Jaksic
Teaching Assistant: A. Tomberg

Time: 30 min

Family Name (Please Print): _____

First Name: _____

Student Number: _____

No notes or books are allowed.

Calculators are not permitted.

If you need extra space, use the back of the paper for rough work.

There are two empty pages at the end of the exam.

You may use them for rough work.

There is 1 question worth a total of 50 points.

Partial marks will be given.

Write your solution in a clear, complete and logical way.

1. Fill in the blank with the correct result:

$\overline{50}$

- [20 points] Let $f(x, y) = x^2 + xy^4$, $x(s, t) = st^2 + e^s$, $y(s, t) = ts^2 + \ln s$, and $z(s, t) = f(x(s, t), y(s, t))$. Using the chain rule, find the value of

$$\frac{\partial z}{\partial s}(1, 1) = \underline{\hspace{10cm}}.$$

- [15 points] The equation of the tangent plane to the surface

$$z = e^{x^2 - y^2}$$

at the point $(1, -1, 1)$ is

$\underline{\hspace{10cm}}.$

- [15 points] The directional derivative of $f(x, y, z) = e^x \cos(yz)$ in the direction $\vec{v} = \frac{1}{3}(2, 1, -2)$ is

$\underline{\hspace{10cm}}$

Rough work.

Rough work.